

CLAIMS

We claim as our invention:

1. A golf club head comprising:
 - 5 a body having a crown, a sole, and a hollow interior;
a face disposed on the body, the face comprising a heel vertical section, a toe vertical section, and a central horizontal section connected to each of the heel vertical section and toe vertical section, the face also comprising an upper central region, a lower central region, a heel region and a toe region, wherein the each of the heel vertical section, the toe vertical section and
10 the central horizontal section has a first thickness, and each of the upper central region, the lower central region, the heel region and the toe region has a second thickness, and the first thickness is greater than the second thickness by at least 0.025 inch;
wherein the golf club head has a volume ranging from 385 centimeters to 475 centimeters and a mass ranging from 170 grams to 250 grams, a coefficient of restitution ranging from 0.82
15 to 0.875.
2. The golf club head according to claim 1 wherein the face further comprises a transition section which transitions from the first thickness to the second thickness.
- 20 3. The golf club head according to claim 1 wherein the first thickness is greater than the second thickness by at least 0.050 inch.

4. The golf club head according to claim 1 wherein the face is an insert attached to the body.
5. The golf club head according to claim 1 wherein the face is formed integral with the
5 body.
6. The golf club head according to claim 1 wherein the body is an aft-body having an open front, and further comprising a face component attached to the open front of the aft-body, the face component including the face of the golf club head.
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7. The golf club head according to claim 6 wherein the aft-body is composed of a non-metallic material.
8. The golf club head according to claim 4 wherein the body is composed of a non-metallic
15 material.
9. The golf club head according to claim 1 wherein the body is composed of a cast titanium alloy material and the face is composed of a formed titanium alloy material.
- 20 10. The golf club head according to claim 1 wherein the golf club head has a moment of inertial I_{zz} about the Z-axis through the center of gravity of greater than 3000 g-cm^2 and a moment of inertia I_{yy} about the Y-axis through the center of gravity in the range from 2000 g-

cm² to 4000 g-cm².

11. The golf club head according to claim 5 wherein the face and body are cast together.

5 12. The golf club head according to claim 1 wherein each of the heel vertical section, the toe vertical section and the central horizontal section has a thickness ranging from 0.100 inch to 0.200 inch, and each of the upper central region, the lower central region, the heel region and the toe region has a thickness ranging from 0.030 inch to 0.090 inch.

10 13. The golf club head according to claim 1 wherein each of the heel vertical section, the toe vertical section and the central horizontal section has a thickness ranging from 0.125 inch to 0.165 inch, and each of the upper central region, the lower central region, the heel region and the toe region has a thickness ranging from 0.050 inch to 0.070 inch.

15 14. The golf club head according to claim 4 wherein each of the heel vertical section and the toe vertical section extends from a bottom the insert to a top of the insert.

15. The golf club head according to claim 1 wherein the heel vertical section, the toe vertical section and the central horizontal section form an H shape.

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16. The golf club head according to claim 1 wherein the heel vertical section, the toe vertical section and the central horizontal section form a substantially X shape.

17. The golf club head according to claim 1 wherein an internal surface of the face is contoured to create a smooth surface.

18. The golf club head according to claim 14 wherein a top end and a bottom end of each of the heel vertical section and the toe vertical section have a width that is greater than a middle portion of each of the heel vertical section and the toe vertical section.

19. The golf club head according to claim 4 wherein the insert has a mass ranging from 25 grams to 40 grams.

20. The golf club head according to claim 19 wherein the insert has a height ranging from 1.80 inches to 2.50 inches, and a width ranging from 3.50 inches to 5.00 inches.

21. A wood-type golf club head comprising:

a body having a crown, a sole, a front wall and a ribbon, the front wall having an opening; and

a face insert attached to the body, the face insert having an exterior surface and an interior surface, the interior surface of the face insert comprising a heel vertical section, a toe vertical section, and a central horizontal section connected to each of the heel vertical section and the toe vertical section, the face also comprising an upper central region, a lower central region, a heel region and a toe region, wherein the each of the heel vertical section, the toe vertical section and the central horizontal section has a first thickness, and each of the upper central region, the lower

central region, the heel region and the toe region has a second thickness, and the first thickness is greater than the second thickness by at least 0.025 inch;

wherein the golf club head has a volume ranging from 385 centimeters to 475 centimeters and a mass ranging from 170 grams to 250 grams, a coefficient of restitution ranging from 0.82 to 0.875.

22. The wood-type golf club head according to claim 21 wherein the body is composed of a material selected from the group consisting of magnesium, aluminum, polycarbonate, thermoplastic polyurethane, PBT (Polybutylene Terephthalate), blends of polycarbonate and polyurethane, carbon epoxy and plies of pre-preg.

23. The golf club head according to claim 21 wherein the face further comprises a transition section which transitions from the first thickness to the second thickness.

24. The golf club head according to claim 21 wherein the first thickness is greater than the second thickness by at least 0.050 inch.

25. The golf club head according to claim 21 wherein the body is composed of a cast titanium alloy material and the face insert is composed of a formed titanium alloy material.

26. The golf club head according to claim 21 wherein the golf club head has a moment of inertial I_{zz} about the Z-axis through the center of gravity of greater than 3000 g-cm^2 and a

moment of inertia I_{yy} about the Y-axis through the center of gravity in the range from 2000 g-cm² to 4000 g-cm².

27. The golf club head according to claim 21 wherein each of the heel vertical section, the toe
5 vertical section and the central horizontal section has a thickness ranging from 0.100 inch to 0.200 inch, and each of the upper central region, the lower central region, the heel region and the toe region has a thickness ranging from 0.030 inch to 0.090 inch.

28. The golf club head according to claim 21 wherein each of the heel vertical section, the toe
10 vertical section and the central horizontal section has a thickness ranging from 0.125 inch to 0.165 inch, and each of the upper central region, the lower central region, the heel region and the toe region has a thickness ranging from 0.050 inch to 0.070 inch.

29. The golf club head according to claim 21 wherein each of the heel vertical section and the
15 toe vertical section extends from a bottom the face insert to a top of the face insert.

30. The golf club head according to claim 21 wherein the heel vertical section, the toe
vertical section and the central horizontal section form an H shape on the interior surface of the
face insert.

31. The golf club head according to claim 21 wherein the heel vertical section, the toe
vertical section and the central horizontal section form a substantially X shape on the interior

surface of the face insert.

32. The golf club head according to claim 21 wherein the interior surface of the face is contoured to create a smooth surface.

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33. The golf club head according to claim 29 wherein a top end and a bottom end of each of the heel vertical section and the toe vertical section have a width that is greater than a middle portion of each of the heel vertical section and the toe vertical section.

10 34. The golf club head according to claim 21 wherein the insert has a mass ranging from 25 grams to 40 grams.

35. The golf club head according to claim 21 wherein the insert has a height ranging from 1.80 inches to 2.50 inches, and a width ranging from 3.50 inches to 5.00 inches.

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36. A golf club head comprising:

a face component having a return portion and a face insert;

an aft-body attached to the return portion of the face component;

wherein the face insert has an exterior surface and an interior surface, the interior surface

20 of the face insert comprising a heel vertical section, a toe vertical section, and a central horizontal section connected to each of the heel vertical section and the toe vertical section, the face insert also comprising an upper central region, a lower central region, a heel region and a toe region,

wherein the each of the heel vertical section, the toe vertical section and the central horizontal section has a first thickness, and each of the upper central region, the lower central region, the heel region and the toe region has a second thickness, and the first thickness is greater than the second thickness by at least 0.025 inch;

5 wherein the golf club head has a volume ranging from 385 centimeters to 475 centimeters and a mass ranging from 170 grams to 250 grams, a coefficient of restitution ranging from 0.82 to 0.875.

37. The golf club head according to claim 36 wherein the aft-body is composed of a material
10 selected from the group consisting of magnesium, aluminum, polycarbonate, thermoplastic polyurethane, PBT (Polybutylene Terephthalate), blends of polycarbonate and polyurethane, carbon epoxy and plies of pre-preg.

38. A golf club head comprising:
15 a body composed of a composite material having a front wall with an opening, a sole, a ribbon;

 a crown plate attached to the body; and

 a face insert disposed within the opening of the front wall, the face insert composed of a material having a density greater than the composite material, the face insert having an exterior
20 surface and an interior surface, the interior surface of the face insert comprising a heel vertical section, a toe vertical section, and a central horizontal section connected to each of the heel vertical section and the toe vertical section, the face also comprising an upper central region, a

lower central region, a heel region and a toe region, wherein the each of the heel vertical section, the toe vertical section and the central horizontal section has a first thickness, and each of the upper central region, the lower central region, the heel region and the toe region has a second thickness, and the first thickness is greater than the second thickness by at least 0.025 inch;

5 wherein the golf club head has a volume ranging from 385 centimeters to 475 centimeters and a mass ranging from 170 grams to 250 grams, a coefficient of restitution ranging from 0.82 to 0.875.